

PHL F316K: Science and Philosophy

University of Texas at Austin

Summer 2015

Course Instructor:

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Office Hours and Location: Monday and Wednesday from 2-4pm in WAG 303

Course Description

Scientists seek to explain phenomena. They ask, for instance, *why did the space shuttle Challenger explode? Why is the mass of a stationary electron $9.10938291 \times 10^{-31}$ kg? Why do hive-bee honeycombs have an hexagonal structure?* By contrast, philosophers of science ask questions *about* science. Our focus will be philosophical questions about the nature of scientific explanation. Questions to be covered include: what constitutes a genuine explanation? Insofar as explanations involve laws of nature, what is the status of these laws? Do the entities posited by our best scientific theories really exist? Does empirical evidence underdetermine scientific theory choice? How are scientific theories generated and confirmed? What characterizes progress in science? What distinguishes a science from a pseudo-science? In particular, is creationism a science?

Course Reading

Weekly readings will be made available on Canvas, and lecture handouts will be distributed in class.

Evaluation

Grading: I adhere to a blind grading policy. So when you submit your assignments, please only include your student EID.

1. Midterm Exam: 20% (Date June 19th)

- The midterm will be a mix of fill-in-the-blank and short answer questions. Only material discussed in lecture will be examinable.

2. Short Paper: 30% (Due July 3rd)

- *Instructions:* You will write a short paper. It will require the close reading and analysis of a passage from one of the readings. I'll send out a list of passages, along with more detailed instructions, well before the paper is due. The paper must be no longer than 700 words. Submit these papers in class on the due date.

3. In-Class Final Exam: 30% (Date July 9th)

- The in-class final exam will be a mix of fill-in-the-blank and short answer questions. Only material discussed in lecture will be examinable. It will be cumulative, so be sure to also study material covered prior to the midterm. In order to reward those that improve, students who receive an A on the exam will receive an A in the course.

4. Attendance and Participation: 20%

- Discussion and general participation are essential components of any philosophy class. So you'll be graded both on attendance and on active participation.

Course Schedule

Reading Guide: I've assigned at least one article (or book chapter) per lecture as required reading. These texts are quite difficult, and many of you have other commitments (e.g. jobs, class, etc.) that may cut into your reading time. But don't let this worry you. My lectures won't assume that you've read the assigned text. Instead, I suggest that you treat the lectures as an introduction to the readings. Armed with knowledge gleaned from lecture (as well as from our subsequent discussion), you'll be well positioned to extract something useful from the texts. So plan to do much of your reading after class.

It is possible to do very well in this course without reading all the papers. I think this is a good thing. Better that you should carefully read a hard but classic paper than that you should instead skim two or three papers. Often I'll let you know beforehand which bits of the set texts warrant special attention.

1. Course Introduction

2. Science vs. Pseudo-Science I: Popper vs. Kuhn

Reading: Karl Popper "Science: Conjectures and Refutations"; Thomas Kuhn "Logic of Discovery or Psychology of Research?"

3. Science vs. Pseudo-Science II: Alternatives to Popper and Kuhn

Reading: Imre Lakatos "Science and Pseudoscience"; Paul Thagard "Why Astrology is a Pseudo-science"

4. Science vs. Pseudo-Science III: The Status of Creationism

Reading: Michael Ruse "Creation Science Is Not Science"; Larry Laudan "Commentary: Science at the Bar—Causes for Concern"

5. Explanation I: D-N Model of Explanation

Reading: Carl Hempel "Two Basic Types of Scientific Explanation"

6. Explanation II: Causal Explanation

Reading: David Lewis "Causal Explanation"

7. Explanation III: Challenges to Causal Explanation

Reading: Denis Walsh, Tim Lewens, and Andre Ariew "The Trials of Life: Natural Selection and Random Drift"; Mohan Matthen and Andre Ariew "Two Ways of Thinking about Fitness and Natural Selection"

8. Explanation IV: Causal Explanation and Explanatory Exclusion

Reading: Jaegwon Kim "Mechanism, Purpose, and Explanatory Exclusion"

9. Laws of Nature
Reading: Nancy Cartwright “Do The Laws of Physics State The Facts?”
10. Intertheoretic Reduction I
Reading: Jaegwon Kim “Multiple Realizability”
11. Intertheoretic Reduction II
Reading: Jerry Fodor “Special Sciences: Still Autonomous After All These Years”
12. Intertheoretic Reduction III
Reading: Jessica Wilson “Metaphysical Emergence: Weak and Strong”
13. Underdetermination I: Quine-Duhem Thesis
Reading: Pierre Duhem “Physical Theory and Experiment”; W. V. O. Quine “Two Dogmas of Empiricism”
14. Underdetermination II: Demystifying Underdetermination
Reading: Larry Laudan “Demystifying Underdetermination”
15. Prediction and Evidence I: The Problem of Induction
Reading: Karl Popper “The Problem of Induction”; Wesley Salmon “Rational Prediction”
16. Prediction and Evidence II: Scientific Virtues
Reading: Carl Hempel: “Criteria of Confirmation and Acceptability”
17. Prediction and Evidence III: Significance of Prediction
Reading: Laura Snyder “Is Evidence Historical?”; Peter Achinstein “Explanation v. Prediction: Which Carries More Weight?”
18. Confirmation and Evidence I: Bayesianism
Reading: Wesley Salmon “Rationality and Objectivity in science *or* Tom Kuhn Meets Tom Bayes”
19. Confirmation and Evidence II: Anti-Bayesianism
Reading: Clark Glymour “Why I Am Not a Bayesian”
20. Evidence and Values
Reading: Helen Longino “Values and Objectivity”

Course Business

1. *Plagiarism and Academic Misconduct.* The University of Texas at Austin takes plagiarism (and academic misconduct more generally) very seriously. You are responsible for knowing what plagiarism is, and also for knowing the particular plagiarism penalties. Plagiarism includes (but is not limited to) the use of a thinker's ideas or words without proper citation; the purchase of assignments; the use of internet resources without proper citation; and the submission of work written (in whole or in part) by another. Penalties for plagiarism range from a zero on the assignment to suspension from the university. Furthermore, I'm known to be an excellent detector of plagiarism: *if you cheat, I will catch you.* So don't do it.
2. *How to Avoid Plagiarising:* Most students plagiarise because they believe themselves to be without options. But no student will ever be without options in this course. If you find yourself in trouble, and tempted to cheat, contact me *immediately*. If you haven't *yet* cheated, a solution can always be found.
3. *Late Penalties.* This will be a challenging and fast-paced course. It is highly recommended that you attend every class meeting and get your work in on time. The late penalty on the paper is set at 1/3 of a letter grade per day, to a maximum of three days (this includes weekends/holidays), unless accompanied by a documented medical explanation or due to a family emergency. Any work outstanding beyond this point will receive a grade of 0.
4. *Your Course Contact.* I am your primary contact for this course. Course-related emails MUST have "PHLF316K" somewhere in the subject line. I will not answer emails that ask for information readily available on either Canvas or the course syllabus, so it is always a good idea to begin by checking those two places. I will also not answer emails that ask for information easily obtainable through regular class attendance. Lastly, I will not answer emails that ask substantive philosophical questions—those with such questions should bring them to my office hours. That said, do not hesitate to email me when appropriate. I will respond to all appropriate emails within 24 hours.
5. *Special Accommodations.* I am more than happy to assist with special accommodations for students registered with accessibility services. If you are registered with accessibility services, please don't hesitate to have your accessibility services representative get in touch with me. More information on accommodations can be found here: <http://ddce.utexas.edu/disability/>